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# Education's Influence on National Power

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## ABSTRACT

National security rests on the collective strengths of our elements of national power--economic, political, social, and military. However, these institutions are only edifices without the talents and capabilities of the nation's people. The foundation to it all is the nation's education system--how well the system prepares the citizenry is the *sine qua non* of our national security posture. Can we assess how well our educational system is doing by evaluating the performance of our basic national institutions?

This paper examines two key elements of power--economic and political/social--to assess how the health of these institutions correlates with the performance of the nation's education system. An analysis of these measures and the author's conclusions are also offered.

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## ABSTRACT

National security rests on the collective strengths of our elements of national power--economic, political, social, and military. However, these institutions are only edifices without the talents and capabilities of the nation's people. The foundation to it all is the nation's education system--how well the system prepares the citizenry is the *sine qua non* of our national security posture. Can we assess how well our educational system is doing by evaluating the performance of our basic national institutions?

This paper examines two key elements of power--economic and political/social--to assess how the health of these institutions correlates with the performance of the nation's education system. An analysis of these measures and the author's conclusions are also offered.

*No nation can achieve greatness unless it believes in something--and unless that something has the moral dimensions to sustain a great civilization. The release of human potential, the enhancement of individual dignity, the liberation of the human spirit--those are the deepest and truest goals to be conceived by the hearts and minds of the American people. And those are the ideas that can sustain and strengthen a great civilization--if we believe in them, if we are honest about them, if we have the courage and stamina to live for them.*

*--John Gardner*

*Human history becomes more and more a race between education and catastrophe.*

*--H.G. Wells*

## **1. INTRODUCTION**

Unless you're Rip Van Winkle and have been asleep for the past 20 years or more, you've no doubt heard the outcries that the education system of the United States (U.S.) does not measure up to the needs of a nation competing within an increasingly diverse, international marketplace. From state and/or local governments to the federal level, from public institutions to private corporations--all complain that the U.S. education system does not deliver the right kind of "products" to meet the country's needs, both internal to the nation and within the context of a global economy. The warnings telegraphed over ten years ago by the National Commission on Excellence in Education, issued in their bold report entitled "A Nation at Risk," are still trumpeted today:

"Our nation is at risk, our once unchallenged pre-eminence in commerce, industry, science, and technical innovation is being overtaken by competitors throughout the world-- [because] the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. . .if an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war." (Lund, 10)



Consider the following statistics offered by the Clinton Administration's Education Department in 1994 (Arizona Republic):

- o One third of 17-year-olds in school said they weren't required to do daily homework in all school subjects
- o 9- and 13-year-old students are reading more, but their proficiency has declined
- o Less than 10 percent of 17-year-olds can do "rigorous" academic work in basic subjects
- o Only 2 percent of 11th-graders write well enough to meet national goals.

Other negative trends have been presented in the science and mathematics areas. In a 1991 assessment of science and math achievement, 13-year old Americans were largely outperformed by students from five countries. Korea, Taiwan, and Switzerland bested US students in all math categories tested, while Korea, Taiwan, and Hungary scored higher than the US in 3 of the 4 science categories. None of the five foreign countries tested (France was also included) scored lower than the US in any math or science category. (CQ Researcher, 224)

Data from industry also suggests a growing dissatisfaction with the pool of job applicants. "The attainment of basic skills in math and language is no longer sufficient for productive employment," says Gordon M. Ambach, executive director of the Council of Chief State School Officers. "Increasingly, American workers must have higher-order capacities . . . we now recognize that these skills are vital for everyone." (CQ Researcher, 220) Industrial leaders are also outspoken on this issue. Alan Wurtzel, Chairman of the Board for Circuit City Stores, told Congress it was tough to find qualified employees for his company. On average, it took 10 applicants to hire one front-line employee (i.e., cashiers, stockmen, sales counselors). Twenty-five percent would fail the initial "attitude" screen, while another 25 percent would fail to perform simple clerical or cashiering tasks. (U.S. Senate, S. HRG. 102-935, pg 74)

Yet there are several experts who claim the nation's schools are all right and, in many cases, improving. Doctor Gerald Bracey, while director of research and evaluation of Cherry Creek School District in Englewood, Colorado, argued against the "assumption" our schools were failing, calling these arguments "a big lie." Bracey contended our schools "have never achieved more than they currently achieve. . . [and in fact] some indicators [attendance, test scores, graduation rates, college attendance and graduation 'persistence'] show them performing better."<sup>1</sup> (Bracey; 106) Educators Marvin Cetron and Margaret Gayle also suggest there is reason for hope since the warnings sounded by the "Nation at Risk" assessment. They argue that student SAT performance is up, the number of dropouts is declining, and more students are passing the intermediate and above proficiency levels for math, reading, and science, while fewer students reside in the "basic" levels for these subjects. (Cetron et al, 8/9)

Setting aside the issue of who's right in this debate, all of these arguments hover around the central issue--how we measure the performance of our education system. How successful we are at educating our citizens affects the performance of the nation's economic, political, social, and defense institutions. National security--protecting the nation, its people, and their way of life--depends upon the nation's ability to develop, marshal, and channel its resources (the *elements* of national power) in support of the general welfare and collective security of the people. The *fundamental national resource*--upon which all elements and institutions rely--*is our people*. If "a nation's wealth lies in its people" (Adam

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<sup>1</sup> Bracey contends the negative press is because the U.S. school system is a victim of its own success. He suggests the measures of failure are too near-term in focus, thereby ignoring just how far U.S. education has come since the turn of the century. He cites rising trends in graduation rates, stable or rising trends in test scores, and rising attendance and graduation from college, all against the backdrop of a rising population. The "tide of mediocrity" suggested by the authors of *A Nation at Risk* just doesn't exist. (It may be that the public is reacting to societal problems (drugs, violence, crime) and associating these "malaises of youth" with the performance of the educational system.)

Smith), then the education system is the means to leverage that wealth. Intuitively, a nation's education system and national security go hand in hand--the nation's future is at risk if the system doesn't deliver the right "products". Assuming that the national security of the United States is linked to its education system, **how do we assess the performance of this system via the vitality and robustness of the U.S.'s economic, political/social, and cultural systems?**

The premise of this paper is that by analyzing the interrelationships between the educational system and key elements of our national security (political, economic, social, cultural, governmental, military) one should be able to draw a direct correlation between the health of these institutions and education's contribution to that performance. This process could yield a set of measures very useful to many players--not only would one be able to assess a nation's prospects for future security, but the measures could also flag those shortfall areas needing critical attention.

This paper begins with a brief overview of the the US Education System, the present measures of output, and some perspectives on comparing education systems of other countries to ours. Next, the paper explores, in depth, two key elements of national power--the economy and political/social structure--to determine the relationships between the performance of the educational system and the health of those two institutions. Finally, the author offers his conclusions and recommendations.

## **2. THE U.S. EDUCATION "SYSTEM"**

### **A. System Structure**

The education process in the U.S.--involving a multitude of players, public and private--can be viewed in a series of phases. In the initial phase, starting from birth until kindergarten, the family provides the majority of input, shaping the individual almost exclusively in the home environment. During this phase the child also may be enrolled in preschool or daycare programs, expanding his or her awareness, developing socialization skills, and exposing him or her to different "parental" inputs. The child "formally" enters the education system at age 5 with enrollment in kindergarten--this starts the next phase of education, known as the elementary and middle school period of grades K to 8. The third phase runs from grades 9 to 12, ending with a high school diploma and graduation at age 18. Traditionally during this period the individual "decides" what to do with the rest of his or her life, choosing between vocational (skill prep) or academic (college and beyond) programs. The fourth phase of education, the post-high school period, provides a wide array of skill development and academic alternatives oriented towards work and a career in the "real world." Initially, individuals can choose among vocational and/or technical schools, colleges and universities, and community and junior colleges. Further educational alternatives offered later in this phase include graduate school, professional training, worker training, and continuing/adult education programs. This continuum of education alternatives represents the various opportunities for "life-long learning," influenced by and depending upon a person's abilities, inclinations, and individual circumstances.

### **B. Performance Measurement, National Goals, and National Measures**

The performance of this system--the output of the process--is measured in various ways with the measures grouped into three broad categories. The primary measures are those of student academic

performance--how well the individual is progressing through his or her "learning journey" (e.g., Iowa Test of Basic Skills, Stanford Tests, California Aptitude Test). The second group of measures are oriented toward **process performance**--monitoring those "overhead functions" of the education system (such as class size, teacher/pupil ratios, enrollment/dropout rates, etc.) that describe the learning environment, thereby influencing individual performance. This category would also include several "backdrop" measures of the socio-economic environment's influence on the education process. (Bearing in mind the "cause and effect" dynamic that exists--did the social conditions contribute to the educational situation, or vice versa?) The last category of measures concerns **the influence of the education system**--how do the outputs of the education system affect and influence the health of the nation's institutions.

Recognizing the old adage "what gets measured gets done," former President George Bush and President William "Bill" Clinton put the weight of their office behind a set of top-level, national objectives which have become known as Goals 2000. These six goals, which establish high-level national standards to be met by the year 2000, are as follows:

**Figure 1: Goals for the U.S. Education System by the Year 2000**

- *All children in America will start school ready to learn*
- *The high school graduation rate will increase to at least 90 percent*
- *American students will be competent in core academic subjects*
- *U.S. students will be first in the world in math and science achievement*
- *Every adult American will be literate and possess the skills necessary to compete in a global economy*
- *Every school in America will be safe, disciplined, and drug free*

Source: Berenbeim, Ronald E., Corporate Support for Mathematics and Science Education Improvement, Conference Board Report #1022, New York, 1993, pg 10

Table 1 summarizes the 60 major indicators watched by the U.S. Department of Education's Office of Educational Research and Improvement, many of which support the Goals 2000 initiative. The measures compiled by the National Center for Education Statistics (NCES) cut across all phases of the

**Table 1--U.S. Education Statistics as Tracked by the U.S. Department of Education**

**o Student Performance**

- *Persistence in High School*
- *Transition, Persistence in postsecondary education*
- *Skill improvement training among currently employed workers*
- *Reading, writing, math, science proficiency*
- *Scholastic Aptitude Test (SAT) scores*
- *Educational attainment (by race, age, and sex)*
- *Adult literacy*
- *International comparisons (math, science, literacy, attainment)*

**o Process Performance (educational system and societal/ethnic factors)**

- *Academic/Vocational/Personal use course taking in high school*
- *High School/College course taking patterns (science, math, languages)*
- *Family background, choice of college major, fields of study & degrees*
- *Enrollment/dropout rates (public, private)*
- *Racial/Ethnic distribution (elementary/secondary students)*
- *Parental involvement in education*
- *Student Preparedness for class*
- *Education of Disabled students*
- *Children with difficulty speaking English*
- *Children in Poverty*
- *Drug and Alcohol use in school*
- *Working while in school*
- *Expenditures per student*
- *Teacher Professional Development/Certification*
- *Teacher/Professor salaries*

**o Education's influence on the Country**

- *Transition from school to work*
- *Employment of young adults*
- *Annual earnings of young adults*
- *Voting behavior, by education attainment*
- *Sources of newly-hired teachers*
- *Health-related behavior, by education level*
- *Community service by full-time bachelor's degree students*

**Source:** The Condition of Education 1994, National Center for Education Statistics, U.S. Department of Education (NCES 94-149)

education system, but are focused mainly on the primary, secondary, and immediate post-secondary periods. Using the categorization approach described above, approximately 20 percent of the indicators focus on student performance, while almost 70 percent of the metrics look at the educational process and influencing, societal factors. The first two categories are more readily measureable and tangible, although not without their issues of interpretation for what the data means and what actions/policies should be pursued. Slightly more than 10 percent of the NCES indicators could be placed in the third category--measuring education's influence on the country's institutions. Closer inspection of these indicators reveals the limitations of using them in a comprehensive manner to assess the nation's economic or social/political health<sup>2</sup>. While the divisions shown are debatable, they illustrate a point. The indicators shown measure collective performance of individuals as inputs to or products of the education system. What is missing is more depth in the measures of education's effect on the country overall--are we any better off as a nation because of our education system, and how do we best measure this?

### C. Putting International Comparisons in context

Meaningful comparisons of education system performance between countries are difficult, if not impossible to come by. Comparisons within and across national contexts are difficult and are likely meaningless. When you consider that education serves social and cultural purposes, taking the results of

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<sup>2</sup> The NCES tracks only five indicators of economic and other outcomes of education. Three deal with the microeconomic dimension (transition from high school to work, annual earnings of youth, and employment of young adults), while the other two treat the social dimension (voting and health related behaviors). I added two others--sources for new teachers, and community service work by undergrads--to the category "Education's Influence on the Country" in Table 1. They do not adequately capture the depth and breadth of education's impact on the nation, nor would they serve as a solid basis to evaluate education's national security effect (let alone serve as a tool for international comparisons).

different systems and comparing them out of context is like comparing apples and oranges. The studies done to date comparing U.S. students with other nations are flawed because neither the students, the curricula, the schools, nor the tests are comparable to one another. (Office of Technology Assessment, 136/7) For example, Japanese and Korean students are in school 243 and 220 days, respectively while the U.S. average is 180 days. Korean students consider it a personal honor to test "for their nation." (Just imagine the reaction of a U.S. student as he/she is told they have been selected to take such a test!) (Bracey, 112) There's yet another dimension to the test control topic. In Europe and Asia, testing is primarily used to channel students into future educational opportunities on the educational pyramid tailored to their capabilities. These nations have all but done away with standardized testing before age 16 of the likes found in the U.S. (Office of Technology Assessment, 135)

Language translation poses yet another dilemma for comparing test data--English words can be rendered by several different words (as in French) or may have no equivalent in other foreign languages. Finally, the comparisons can be skewed by the size of the test-taking population. Other nations have an elite group of students taking the tests by virtue of their high drop-out rates and tracking approaches to academic and job-related curricula, while most American children are in school and take the test. The test data may explain differences in the **cultural approach** to education, but one would be hard pressed to draw conclusions on the relative inabilities of U.S. students to learn. (Bracey, 112/3) Similar cries of "we're falling behind" were issued in the late 1950s after Sputnik, but then it was the Soviets who were fixing to bury us. (Wilson, 36-37)

Consider the cases of Japan and Germany. Both were devastated by the war and both had to rebuild their economies from scratch. What they have in common, other than a general lack of natural resources, are the strengths of their people. Germany's policy of employment security, while initially



appearing to be a hindrance, is in fact a significant catalyst for the human resource investments needed to achieve a highly flexible workforce. Employers can count on a relatively stable, known workforce (people are reemployed within the company rather than laid off). As a result, employers are more likely to reinvest in worker training since they will see a return on their investment. Employees are more receptive to changing work rules and tasks due to their training and the knowledge they have a secure job. An extensive apprenticeship program trains the worker, leading up to the worker's placement in the firm-- 90 percent of workers are employed by the firm that trained them. (Marshall and Tucker, 44-48)

### **3. NATIONAL POWER AND THE CORRELATION TO EDUCATION--THE ECONOMY**

In 1776, Adam Smith asserted in his book, *The Wealth of Nations*, that "A nation's wealth lies in its people." This collective wealth, embodied in the backgrounds, talents, skills, and experiences of the individual citizens, is due largely to the education and training the people receive and apply. Intuitively, one can establish a linkage between educational performance and nation's overall economic health. The challenge in supporting this assertion lies in measuring the extent to which the education system is contributing to the nation's economy. The implications are compelling. The Committee for Economic development estimates that each year's dropouts cost the nation more than \$240 billion in lost earnings and forgone taxes over their lifetimes, while billions of dollars more go to crime control, welfare, health care, and other social services. (Doyle, 95) Yet as the prevailing research bears out, it has proven difficult to directly measure education's effect on economic growth at either the national or individual levels. Economists have tried instead to use the indirect method, measuring the factors of production and assessing the residual growth to education. (Gallo and Levitan, 17) Nevertheless, there are some key elements to consider, ones whose trends and causal relationships may bear watching by policymakers.

Roland Sturm's work for the Rand Corporation, *How Do Education and Training Affect a Country's Economic Performance?* surveyed the literature to understand the facts behind the assertion that the education and training (ET) system is the primary culprit in the United States' eroding position in the world economy.<sup>3</sup> Sturm condensed his findings into three broad areas for analyzing ET's contribution to economic performance and assessing international competitiveness: ET's contribution to macroeconomic growth; ET's effect on an individual's productivity (measured thru wages or directly), and; the linkage between "knowledge" and technological change. (Sturm, 1)

#### A. Macroeconomic perspectives

At the macroeconomic level, Sturm found that education contributed anywhere from 15-25 percent of the growth in per capita gross domestic product (GDP).<sup>4</sup> Education's positive effect on labor quality was cited as one of the key factors affecting GDP growth. One economist, D.W. Jorgenson, estimated that education was 38 percent of labor's overall contribution, and accounted for over 90 percent in the change in labor quality. Another economist, J.H. Bishop, correlated declines in test scores with similar declines in both labor quality and GDP in 1987.<sup>56</sup> (Bishop, 15) Derek Aldcroft's research indicated that

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<sup>3</sup> Sturm's literature survey was the most comprehensive work found in correlating the contribution of education to the economy.

<sup>4</sup> Data compiled for 28 countries in North and Latin America, Europe, Asia, and Africa, during the period prior to the 1970s and from 1973-1984.

<sup>5</sup> While a variety of measurement factors were assessed, the individual precision of these factors is suspect to: 1) varying assumptions of the weights of contributing factors, and; 2) likely criticisms of the underlying assumptions used. Nevertheless, the analyses revealed a positive correlation between education and the economy--education's effect on labor quality was generally found to be among the most important contributors to economic growth.

Britain's poor, post-war macroeconomic performance was largely due to labor skill shortages and the resulting productivity losses. The causality between skills shortages and productivity in Britain's case was dramatic. Britain's share of world export in manufactured goods fell from 25 percent in 1950 to 10 percent in 1990. Meanwhile productivity, once the highest in Europe, fell to 60 percent of the European average during the same period. Some of the underlying causes were low levels of achievement in math and languages, lackluster vocational standards for employment, and an ET system not geared for work. (Aldcroft: 124-127, 141)

The issue of labor skills and math/science proficiency are with us today--productivity and competitiveness of the economy lie in the skills of our people and our capacity to use highly-skilled people flexibly in the workplace. The U.S. education system was founded on the principles of mass production of a low-skilled workforce to meet low-skilled, mass production needs of industry. Now the economically successful countries have organized their education around the principle that everyone would have high incomes if labor quality were to be high and companies were organized to use these resources effectively.<sup>7</sup> (Marshall and Tucker, xvi, xvii) When 50 percent of U.S. high school graduates don't go on to college, school-to-work transition and continuing education programs are key to developing high-performance workers who can flexibly move from task to task, employing complex tools and current technologies. These individuals then become the core of a high-performance workplace, economy, and nation. (S. HRG. 102-935: 7, 54, 59) Industry leaders have stressed the importance of improving

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<sup>6</sup> He estimated labor quality would be 2.9 percent higher and GNP \$86 billion higher in 1987 if test scores had grown at the same rate after 1967 as they did from 1942 to 1967.

<sup>7</sup> While some individual skills programs do well, the U.S. lacks and overall labor skills strategy, coupled with the nation's inability to concentrate diverse resources and limited industry demand for highly skilled labor. The result is overall mediocrity.

science and mathematics education in the schools, both by improving teaching credentials/training and through curriculum changes that put more emphasis on team problem solving.<sup>8</sup> (Berenbeim, 10). The lessons of history are readily applicable today--an "educated, flexible, and inquisitive workforce" is essential to take advantage of economic opportunities. (Aldcroft, 9)

#### **B. Microeconomic view--the individual worker**

While the skills mix is important at the macro level, measuring the economic effect of education at the worker level has shown mixed results. Sturm found the effects of education on worker productivity were more directly correlated (although not totally unambiguous) in the agricultural sector.<sup>9</sup> However, for a variety of other different types of work, Sturm found no positive relationship between the level of education and individual worker productivity, particularly when comparing managerial and professional employees. (30) Data on earnings alone showed limited utility in correlating them with productivity gains. Even more problematic was calculating the social returns to education, although "highly educated workers have a comparative advantage in implementing new technology" because they are better able to differentiate systemic changes and take advantage of the new possibilities. (Sturm: 18, 19, 30) Other researchers agreed with Sturm that reliable productivity measures continue to remain elusive at the

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<sup>8</sup> Florida's Summer Industrial Fellowship for Teachers drove home the importance of more advanced technology, group projects, and better grasp of practical applications as the vehicles for effective science and math instruction. Said one teacher. "The most important thing I have learned so far is that most of the problems are solved by using teamwork."

<sup>9</sup> Sturm found it easier to measure the effects of education in agriculture because the factors of production are simpler (more direct relationship between individuals and actual goods) and because labor markets are more fragmented (especially in less-developed countries). As the structural factors of production become more complex, Sturm found it tougher to link productivity directly to education.

individual worker level. (Gallo and Levitan, 15-17)

The most prevalent measure of education's effect at the worker level has been the relationship between education attainment levels and economic gains. In a study of the American workforce since WW II, the income of 25-34 year-old colleges graduates equalled or exceeded that of 45-54 year-old men with only a high school diploma, even though the latter had a two-decade advantage of work experience. On average, workers with bachelor's degrees earn twice the monthly income of those not continuing beyond high school. (Gallo et al, 17/19) One assumes this rise in income through higher education is attributable to increased productivity on the part of the worker, yet as we discussed above, these productivity measures are particularly difficult to correlate. In reality, the "credential effect" may account more for the income gains achieved. For example, Gallo and Levitan postulate that jobs now requiring a bachelor's degree were previously landed with only a high school diploma, indicating "a certain amount of inflation [with] rising American educational credentials." (21) Wage differentials were also attributed to wage inequalities within the same education/experience groups, between genders, and across races. "Credentialism", more than improved abilities, becomes more of a factor as earners progress in their careers. While educational attainment will likely improve one's economic position, the gain can be attributed to numerous other factors, the least of which may be improved worker productivity. Even more ironically, the increased income and free time may enhance educational achievement, which is counterintuitive to one's beliefs about education's contribution to the economy. (Aldcroft, 14; Gallo, 16)

### **C. Systems perspective--collective knowledge and technological change**

"The relationship between a strong and vibrant educational system and a healthy national

economy is inseparable in an era in which economic growth is dependent on technology."<sup>10</sup> (Dabrowski, 12) None of the above approaches for measuring education's effect on the economy take a systems view, both in the interrelationship among the elements (the individuals) and in their effect on the pace of subsequent change (overall productivity, innovations, etc.). The dynamics of technological change act as a destabilizer to the established relationships among the elements within any given operation. It is only through education and training (ET) that individuals are able to exploit the opportunities presented by these changes and "adapt" the operation accordingly. (Sturm, 32-33) It is here where there may be a closer correlation between research and development (R&D) spending and ET as the means for enhancing a firm's competitiveness and productivity. Research enhances the conscious learning activities of the firm, not only making them more productive but also enhancing their technological knowledge and capabilities (offering yet another springboard for "exploitation"). (Sturm, 35) In other words, R&D spending and reinvestment in the firm's "capital assets" may be a key characteristic of a learning organization.

William Becker and Darrell Lewis argue that *higher education*, as a key player in the national economic development of the U.S., influences (and is influenced by) technological change through the production, diffusion, and transmission of knowledge. They examine in detail the social rate of return and aggregate measures of higher education's contribution to economic growth. Note that while U.S. research in this area has been limited to the most educated portion of the workforce, several European studies have similarly focused on workers without a college education. Those studies have shown that productivity advantages accrue to those nations investing in vocational training and establishing higher professional

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<sup>10</sup> From the Omnibus Trade and Competitiveness Act of 1988.

standards.<sup>11</sup> Yet many experts suggest it's possible to overinvest in either education or physical plant, so care must be taken to invest in ET that properly targets economic growth. (Aldcroft, 11-13; Becker and Lewi, ix, 2, 8)

#### **D. Analysis of Economic Indicators in an Educational Context**

The health of a nation's economy, as measured broadly by growth in GDP, depends upon the quality and diversity of "products" from its education system. Some of the macrolevel measures discussed above that indicate the education system's effect on the economy include: labor quality; income levels and academic achievement; math and science achievement; R&D spending (as a means for fueling ET activities); levels of professional/vocational/technical training; continuing education throughout the "workforce years"; and labor skills mix (surpluses/shortages). All of these measures are important "windows" to the economy from the educational perspective. Policymakers, through the President's Council of Economic Advisors, should scrutinize these indicators as one means to gauge education's contribution to macroeconomic performance, in order to assess the need for corrective action in the form of additional educational investments in the citizenry/workforce.

However, greater investments in ET could result in lackluster economic growth if political leaders misunderstand the end objectives and the "local conditions." Citing the British and Third World examples where ET "investment" policies failed in the last 50 years, Aldcroft demonstrates the evolutionary as well

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<sup>11</sup> (Sturm, 35) Most studies compared Britain and Germany. They found that German firms were more productive in manufacturing and service sectors due to: 1) capabilities to operate and maintain sophisticated equipment; 2) larger fraction of qualified manpower in Germany, and; 3) better organized work processes.

as interdependent relationships among education and economic growth. The degree of a nation's development significantly affects how ET investment is leveraged into economic results--I refer to it as the "crawl before you can walk" theory. For example, Aldcroft postulated that a certain threshold of literacy and education must be present before modernization and industrialization could take place. Moreover, the marginal gains from educational spending will vary greatly--more developed nations would see less return, while lesser-developed nations would be more responsive to additional ET. (Aldcroft, 15-18, 20) And ET's contribution to the economy must be understood within the context of other factors affecting the macroeconomic picture. As Joel Spring points out in *Excellence in Education*, business management decisions and a growing labor force also affected the U.S. decline in productivity during the 1960's through 1980s, maybe more than education did. (78)

#### 4. THE POLITICAL AND SOCIAL DIMENSION

*Education is the sine qua non of democracy.*

*--Thomas Jefferson*

A nation's duty to its citizens is to educate them, not only for productive employment but also to prepare them to act as responsible citizens in all walks of life. The education system and the programs taught must convey the nation's culture and enduring values, while targeted to seek the inclusion of all its citizens. Education should strive to achieve a level of community--a shared understanding of a common purpose--to facilitate the honest airing, discussion, reflection, and dialogue of differing views. In a democracy, education involves connecting the symbols of the nation with its history to form a cultural heritage. (Feinberg, 178, 180)



Given that education is only one of a diverse set of sources influencing the nation's citizens, how might one measure the extent to which education is achieving the proper impact on society? Referring back to Table 1, the NCES tracks the following statistics that address aspects of the nation's political/social health:

**Table 2: Notional Political/Social Indicators as tracked by NCES**

- *Racial/Ethnic distribution (elementary/secondary students)*
- *Parental involvement in education*
- *Education of Disabled students*
- *Children with difficulty speaking English*
- *Children in Poverty*
- *Drug and Alcohol use in school*
- *Voting behavior, by education attainment*
- *Health-related behavior, by education level*
- *Sources of newly-hired teachers*
- *Community service by full-time bachelor's degree students*

Yet most of these indicators are a measure of the education process, as opposed to the effects of education on society. A more telling set of statistics comes from William Bennett's book, entitled *The Index of Leading Cultural Indicators*. Since 1960, crime has increased 300 percent, violent crime is up 550 percent, and the juvenile crime rate has tripled to 430 arrests per 100,000 since 1965. The top disciplinary problems, according to public school teachers are: drug/alcohol abuse, pregnancy, suicide, rape, robbery, and assault. All this against a backdrop of SAT scores falling from 975 in 1960 to 902 in 1993 (Bennet: 18, 22, 29, 83, 84). This is still another set of measures to build a case for social erosion, but how does education affect these results? While not the only solution to the socialization process, the education system is increasingly called upon to prepare students socially and academically, readying them for their future roles in society. As you will see in the following pages, education has a profound (albeit tough to measure) impact on the political and social systems of a nation.

### A. Enduring values, social investment

Despite the continuing hew and cry over teaching values in our schools, enduring values--such as right vs wrong, or truth vs falsehoods--must be taught and demonstrated in the schools. The alternative is a "valueless education system" that teaches by the principle of "everything is relative" (which is not true). Kearns and Doyle believe the nation's schools should prepare its youth by teaching three enduring values--democracy, citizenship, and the workplace. The three "values" pillars would have inherent in them the themes of participation, toleration, fairness, balance, social responsibility, punctuality, neatness, and civility. (Not only are these traits important in society, but they will also be key to success in a high tech workplace.) (Kearns & Doyle, 86, 88) While progress here could be measured by comparing the curriculum used with the results on a standardized test, in actual practice the results were questionable. In fact, the Department of Education found it so difficult to measure citizenship in the "nation's report card," that it dropped that category of questions from the National Assessment of Education Progress (NAEP) test. (Wolf, 39) Notwithstanding the apparent difficulty in measurement techniques, the socialization values that arise from education (i.e., more informed voters, more adaptable to change, more sociable, more equal, more cultured, etc.) are the primary reasons for government investment in education. The concept of "social rate of return" has been one means for measuring the social payback from educational investments.<sup>12</sup> This "investment strategy" is particularly critical in the early years of a child's education (K-12 grades). For example, the researchers found the private and social rates of return for *higher education* in developing and developed countries were lower than those of other levels of

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<sup>12</sup> This indicator is the social return to education as a percentage of the expenses incurred by all society. The economists Psacharopoulos and Jain developed estimates of the rates of return to various education levels across both developed and developing countries.

education, but still above the returns achievable through investments in alternative forms of physical capital. (Becker and Lewis, 3/4)

### **B. Democracy and multicultural/multiethnic diversity**

Hoskin and Sigel suggest the school's place is to offer students an "extensive education experience to equip them to cope with diversity." Schools are a microcosm of society and the lessons they teach, from organization to how business is conducted, are as important as any courses offered in civics and citizenship. The resources spent on multiethnic and multilingual education is one indicator of the education system's coping with the multicultural diversity of the society. This is particularly important since migration is a principal feature of the post-industrial world. Ironically, Hoskins and Sigel found a general ambivalence by the multiethnic societies they studied (Germany, Netherlands, Israel, Canada, Britain) towards their educational responsibilities and the policies to help minorities become fully-participating citizens. (7, 14-18) Their work suggests that several key indicators should be developed to assess the progress of the education system towards meeting the issues of multicultural diversity. Among the potential measures likely: literacy rates; English as a second language (ESL); educational progress; unemployment; voting trends; naturalization trends; and, content/performance of citizenship tests.

Feinberg suggests the activities of multicultural education are much the same as those for development of a democratic republic--the concept of acceptance into a established community with one's cultural identity intact. (169, 172) But he points out a double standard that must be watched for. On one hand, the "lower status" students are expected to become competent in the ways of the dominant group, while no such expectations are place upon the dominant group. (173) Our assumptions about the "transferrability" of Western Democracy to other cultures may have an inherent flaw in them concerning

the universality of "individuality" and "independence" to all humans. Feinberg termed this the "irony of the quest for independence versus need for help." (184/5) The clash between the values of democracy and those of the culture being assimilated seemingly cuts to the core of American beliefs. This "multicultural dynamic" raises a fundamental question: do equality and individuality, freedom and choice run counter to the cultures our nation is assimilating (particularly if that society has a high social/dependency dynamic)?

Finally, the education system should measure the stratification of its students to assess how that measures up to the groupings inherent in society at large (race, gender, and handicaps). At stake are the issues of access, opportunity, and achievement--are these in proportion to the population's demographics, and are all being treated equitably in a system where success is determined by educational attainment? (Altbach, et al: 139-156)

### **C. Educating the elderly--a precious, forgotten resource**

The nation's elderly population (those who have "retired" from work to enjoy other pursuits, often in their late 50s or older) offers us a tremendous resource just waiting to be tapped. Bass, Caro and Chen noted in studies of the elderly that 5.3 million indicated an interest in some meaningful/major roles aside from leisure and family obligations. Elsie Frank, 79 year-old President of the Massachusetts Association for Older Americans, said in 1984 that public policies should

"focus not only on the extension of life but on a healthy, vigorous, empowered, productive old age. Not allowing us to be involved in decisions deprives Americans of all ages of the contribution of many competent and creative persons who are capable of dealing with complex problems." (Bass et al: 4)

Unfortunately, most lifelong ET opportunities have focused on the elderly being retired, with retraining for reemployment receiving little attention. At present, little is known about the extent our less formal ET

system is adequate for retraining older workers. As society ages, the nation must widen its vision of productivity to include the elderly. Two notable programs at University of Massachusetts at Amherst and University of North Carolina at Asheville take a social investment approach, preparing the elderly to provide services for the elderly and mentoring of undergraduate students. (Bass, et al: 19, 20, 226/7) Yet nowhere in our national education system have we specifically focused attention on the elderly in the lifelong learning process, both as a customer and as a resource to others.

#### **D. Analysis of the Political/Social Indicators in an Educational Context**

The nation's education system must constantly strive to balance both its academic and its social missions--education also plays a key role in weaving the social fabric of a functioning democracy. To do this, the education system must prepare the people to be responsible members of society by instilling the values of democracy, citizenship, and the workplace. Our nation has an immigrant heritage, and here too education plays a critical role in assimilating multicultural and multiethnic members into society. Yet we must recognize the dilemma of the "multicultural dynamic" and the challenges that we face in assimilating cultures whose beliefs run counter to the tenets of American democracy. Nevertheless, policy makers can assess progress by tracking several indicators: literacy rates; language proficiency; educational persistency; employment trends; and voting trends. As the median age of the population increases with a growing elderly constituency, the education system must fulfill a "lifelong learning" mission by preparing the aging citizenry for productive participation in society. Here too policy makers should track the progress of "lifelong learners" through the educational system, but before this can become truly meaningful our nation must develop a clear vision for the productive engagement of the elderly within society.

## 5. CONCLUSIONS

*Not everything that counts can be counted, and not everything that is counted, counts.*

*- - Albert Einstein*

Few would argue the importance of education to the economy, to individual and collective quality of life, or to our national security--even "non-intuitives" would agree. This research paper set out to take this notion beyond the intuitive by examining the outcomes of our economic and social institutions, and attempting to correlate these with education's impact on those institutions. This paper reconfirmed that education offers both concrete, tangible benefits and intangible, intuitive rewards. And therein lies the paradox of attempting to fully quantify and conclusively measure education's effect on our national institutions.

The more tangible linkage exists with education's effect on the economy. The research in macroeconomic, microeconomic, and integrated systems approaches for collective knowledge support the current conventional wisdom--the economy will thrive with a highly-skilled, flexible, creative workforce. This paper highlighted some of the major measures of the economy that have a direct correlation to the education system--labor quality; income levels and academic achievement; math and science achievement; R&D spending; worker training levels; continuing education activity of the workforce; and labor skills mixes and shortages. Current U.S. initiatives in school-to-work transition and apprenticeship programs recognize the importance of an education system that is closely integrated with the needs of the economy. However, policymakers and the implementers of education and training programs must exercise care to insure their efforts are considered within a total systems context. As Aldcroft showed, even though Britain affected structural fixes and poured large sums of money into her educational programs, these efforts faltered because her leaders failed to define the objectives of the

educational improvements.

Focusing solely on the economic outcomes of education ignores the equally important, yet intangible role education plays in the health and functioning of society. Besides delivering productive workers, value-based education helps weave the social fabric of the nation by preparing responsible citizens. Becker and Lewis' concept of "social rate of return," while difficult to measure, explains why nations take interest in educating their citizenry, particularly in the K-12 years. Education plays a crucial role in creating and maintaining an environment of social cohesion, which is particularly important in a multiethnic and multicultural society. Policymakers have several indicators that can be used to measure how well minorities are being assimilated as fully-participating citizens--literacy rates, English as a second language (ESL), educational progress and persistency, employment and voting trends. Hereagain, our leaders must be conscious of the tensions created by conflicting values--the so-called "multicultural dynamic." Finally, the education system's role for lifelong learning will become even more important as the nation taps the resources and talents of an ever-aging population. National leaders must do more than track population and societal trends--they must first establish policies that support the continued development and productive employment of the elderly, thereby preparing them for new roles in society.

Neither magic measures of merit nor silver bullet solutions were found in this examination of the interrelationships between "institutional performance" and "educational input." This should not be surprising--it is very difficult to model the dynamic interactions of all the elements within our system. Nevertheless, policymakers, business leaders, educators, and government officials at all levels must continue to assess and reassess the performance of both our national institutions and our educational system. Developing effective measures and assessing interrelationships is an ongoing, evolving process. Our nation must view education as a journey of continuous improvement where the trip matters, not the

final destination. Our economic and social well being, and ultimately our national security, depends upon it.

*The greatest tragedy in life is not failing to reach your goals; the greatest tragedy is having no goals to reach.*

*- - Dr. Benjamin Mayes,  
mentor to Dr. Martin Luther King*



## SOURCES CONSULTED

Aldcroft, Derek H., Education, Training, and Economic Performance (1944-1990), England, Manchester University Press, 1992.

Allinder, Rose M., "Implications of Type of Metric on Regression Assessment," *Diagnostique*, Vol 18, number 4, Summer 1993.

Altbach, Phillip G., Kelly, Gail P., and Weis, Lois. (ed) Excellence in Education: Perspectives on Policy and Practice, Buffalo, New York, 1985.

America's Choice: High Skills or Low Wages!, Report of the Commission on the Skills of the American Workforce, New York, 1990.

*Arizona Republic*, "Education Report: Nation Still at Risk," Editorial/Opinion, August 27, 1994, pg B4.

Bass, Scott A; Caro, Francis G., & Chen, Yung-Ping (eds), Achieving a Productive Aging Society, Westport CT, Auburn House, 1993.

Becker, William E. and Lewis, Darrell R. (ed), Higher Education and Economic Growth, Norwell, MA, Kluwer, 1993.

Bennett, William J., The Index of Leading Cultural Indicators: Facts and Figures on the State of American Society, New York, Simon & Schuster, 1994.

Berenbeim, Ronald E., Corporate Support for Mathematics and Science Education Improvement, Conference Board Report #1022, New York, 1993.

Bishop, John H., "Is the Test Score Decline Responsible for the Productivity Growth Decline?", *American Economic Review*, March 1989, p. 178

Bracey, Gerald W., "Why Can't They Be Like They Were?", *Phi Delta Kappan*, October 1991.

Brothers, Theresa, "School Reform: Business, Education and Government as Partners," Conference Board Report # 1011, New York, 1992

Cetron, Marvin and Gayle, Margaret, Educational Renaissance: Our Schools at the Turn of the Twenty-First Century, New York, 1991

*CQ Researcher*, "Education Standards: Will National Standards Improve U.S. Schools," *Congressional Quarterly*, vol 4, no. 10, Washington D.C., March 11, 1994. (data from National Education Goals Report, 1993 and Educational Testing Service, 1992)

"Corporate Support for Mathematics and Science Education Improvement," Conference Board Report # 1022, New York, 1993.

Decker, Paul V., Basic Skills Education in Business and Industry: Factors for Success or Failure, Office of Technology Assessment, U.S. Congress, 1990.

Dabrowski, Ron H., Major, USAF, International Competitiveness--A National Security Perspective, Air University Press, Maxwell AFB, Alabama, June 1989.

Doyle, Denis P. and Kearns, David T., Winning the Brain Race: A Bold Plan to Make Our Schools Competitive, ICS Press, San Francisco, Calif., 1988.

Feinberg, Walter, Japan and the Pursuit of a New American Identity, New York, Routledge, 1993.

Gallo, Frank and Levitan, Sar A., Got to Learn to Earn: Preparing Americans for Work, Center for Social Policy Studies, Washington, D.C., 1991.

Hart, Margaret, "Partnerships for a Prepared Workforce," Conference Board Report # 1078-94-CH, New York, 1994.

Hoskin, Marilyn and Sigel, Roberta (ed), Education for a Democratic Citizenship: A Challenge for Multi-Ethnic Societies, Hillsdale, N.J., Erlbaum Associates, 1991.

Lund, Leonard and Wild, Cathleen (eds), "Ten Years After A Nation At Risk," Conference Board Report #1041, New York, 1993.

Marshall, Ray and Tucker, Marc, Thinking For a Living: Education and the Wealth of Nations, New York, 1992.

National Center for Education Statistics (NCES), The Condition of Education 1994, U.S. Department of Education, Washington D.C., August 1994.

Oakes, Jeannie, "Educational Indicators--A Guide For Policymakers," Center for Policy Research in Education, University of Wisconsin-Madison, October 1986.

U.S. Congress, Office of Technology Assessment, *Testing in American Schools: Asking the Right Questions*, OTA-SET-519, Washington D.C., U.S. Government Printing Office, February 1992.

Sturm, Roland, How do Education and Training Affect a Country's Economic Performance: A Literature Survey, Rand Corporation, Santa Monica, Calif., 1993

United States Senate, Hearing before the Committee on Labor and Human Resources, 102nd Congress, "The High Skills, Competitive Workforce Act of 1991 (S.1790)," (S. HRG. 102-935), 12 and 20 May 1992.

Wilson, Sloan, "It's Time to Close Our Carnival," *Life Magazine*, 24 March 1958, pp 36-37.

Wolf, Richard M., "The National Assessment of Educational Progress: The Nation's Report Card," *NASSP Bulletin*, pgs 36-45, November 1993.